

REMARKS

Claims 1-4, 6 and 7, all the claims pending in the application, stand rejected. Claim 1 is amended.

As a preliminary matter, Applicants note that the invention as now claimed involves a method of manufacturing a glass substrate for a magnetic disk, which (1) has lithium ions and (2) has no tin, by chemically strengthening the glass substrate in two steps, the glass substrate containing alkali ions. In the first step, the glass substrate is chemically strengthened by the use of a **first alkali ion** having a first ion radius greater than a smallest ion radius of a smallest alkali ion among the alkali ions contained in the glass substrate so as to produce compression stress on a surface of the glass substrate and to produce tensile stress in a depth of the glass substrate. In the subsequent second step, the glass substrate is chemically strengthened by the use of a **second alkali ion** having a second ion radius greater than the first ion radius of the first alkali ion so as to increase the compression stress of the surface of the glass substrate and to reduce the tensile stress of the depth of the glass substrate. The ions are provided by different molten salts.

Claim Rejections - 35 U.S.C. § 102

Claims 1 and 2 are rejected under 35 U.S.C. § 102(b) as being clearly anticipated by Aratani (4,671,814). This rejection is traversed for at least the following reasons.

Claim 1

As noted above, claim 1 has been amended to specify that the glass substrate for a magnetic disk “contains lithium ions and no tin.”

Aratani

Aratani is directed to a float glass (a sheet glass), not to a glass substrate for a magnetic disk. This float glass is a **soda-lime-silicate glass**, as described at col. 5, lines 25-42. In this event, the soda-lime-silicate glass does not contain lithium ions.

Moreover, as would be understood by one skilled in the glass arts, in the two stage process of Aratani, the first stage uses sodium ions and is intended to improve the warp of the float glass, not to chemically strengthen the float glass. The chemically strengthening is carried out in Aratani only at the second stage, which uses potassium ions. There is no teaching or suggestion that lithium ions may be used or that the process can be applied to the manufacture of glass substrates.

By contrast, the glass substrate for the magnetic disk according to the present invention contains lithium ions.

Furthermore, the float glass of Aratani inevitably has “the tin-containing surface layer” as described at col. 2, lines 15-20.

By contrast, the glass substrate for the magnetic disk according to the present invention contains no tin.

Clearly, the Aratani process utilizes substantially different materials in a substantially different process from that set forth in claim 1.

Claim 2

This claim would be patentable for reasons given for parent claim 1.

Claim Rejections - 35 U.S.C. § 103

Claims 1-3 and 6 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Takahashi (6,119,483) in view of Aratani (4,671,814). This rejection is traversed for at least the following reasons.

Takahashi

Takahashi discloses that a chemical strengthening process is carried out by dipping a glass substrate into a mixed molten salt containing sodium nitrate and potassium nitrate in order to manufacture a glass substrate for a magnetic disk. However, Takahashi fails to disclose the two-stage process as claimed. Moreover, Aratani does not remedy the deficiencies in Takahashi.

In Aratani, a two-stage process is carried out in order to solve the problem specific to the *float glass*. As already explained, (1) there are no lithium ions in the float glass and (2) tin is inevitably contained on either one of the principal surfaces of the formed glass substrate because of the specific manufacturing process that requires molten tin to implement the float process.

Specifically, the first-stage is performed to improve the warp of the float glass while the second-stage is performed to increase the strength of the float glass by the use of *potassium nitrate*.

Accordingly, the combination of Takahashi and Aratani fails to teach the added feature of the present invention, i.e., “the glass substrate contains lithium ions and no tin”. Moreover, the two references would not be combined because of the substantially different glass products (sheet glass vs glass substrates), and the substantially different materials in a substantially different process, as mentioned above.

Thus, the present invention is clearly patentable over the combination of Takahashi and Aratani.

Claims 4 and 7 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Takahashi (6,119,483) in view of Aratani (4,671,814) and Morehouse et al (5,379,171). This rejection is traversed for at least the following reasons.

Morehouse et al is cited for the construction of a magnetic hared drive device. Morehouse et al does not concern the composition of glass substrates. Thus, the deficiencies of Takahashi and Aratani are not remedied by Morehouse et al.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

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Respectfully submitted,

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